

# A Rare Incidence of Diabetes Mellitus as A Risk Factor for Pancreatic Adenocarcinoma in A Young Patient

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**Received date:** 19 August 2023; **Accepted date:** 08 September 2023; **Published date:** 15 September 2023

**Citation:** Pandey S, Arora S, Singh A, Kelechi AE, Dhakal S, et al. (2023) A Rare Incidence of Diabetes Mellitus as A Risk Factor for Pancreatic Adenocarcinoma in A Young Patient. J Med Case Rep Case Series 4(15): <https://doi.org/10.38207/JMCRCS/2023/SEP041501102>

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## Abstract

Patients older than 60 are more likely to be diagnosed with pancreatic cancer. It is incredibly uncommon to find this condition in young people. We describe the case of a 27-year-old diabetic male with backache, jaundice, and weight loss as his primary symptoms. The tomographic image showed a mass in the pancreas head associated with multiple hepatic and lymph node metastases. A sample identical to a pancreatic adenocarcinoma with weak differentiation was obtained using a fine needle aspiration puncture (PAAF) for endoscopic ultrasonography evaluation.

**Keywords:** pancreatic cancer, obstructive icteric syndrome, liver metastasis, tumor stenosis, chemotherapy

## Introduction

Pancreatic cancer is a pathology that primarily impacts people over 60. Since the late 1990s, there have been an average of 1 % more new cases of pancreatic cancer in men and women. In 2020, 495,773 cases of pancreatic cancer were anticipated worldwide [1].

Adenocarcinoma is the most common histological finding, whose etiology is still poorly understood. Obstructive icteric syndrome, unique when the tumor mass is located in the head of the pancreas and has invaded the central bile duct, is a symptom of this disease when it is pretty advanced. Less than 5 % of patients survive at the time of diagnosis.

## Case Presentation

A 27-year-old male patient had the mumps at age 7 and many bouts of bronchitis as a child. He had self-limited episodes of liquid diarrhea in recent years. The patient denied smoking, and no relevant family, medical, or surgical history or prior similar occurrences could be found. However, the patient's father had dyslipidemia and hypertension, the mother was 40 when she received a type 2 diabetes mellitus diagnosis, and the paternal cousin had perished from leukemia. Clinically, the patient had experienced recurrent episodes of mild back pain over the previous two months that did not subside

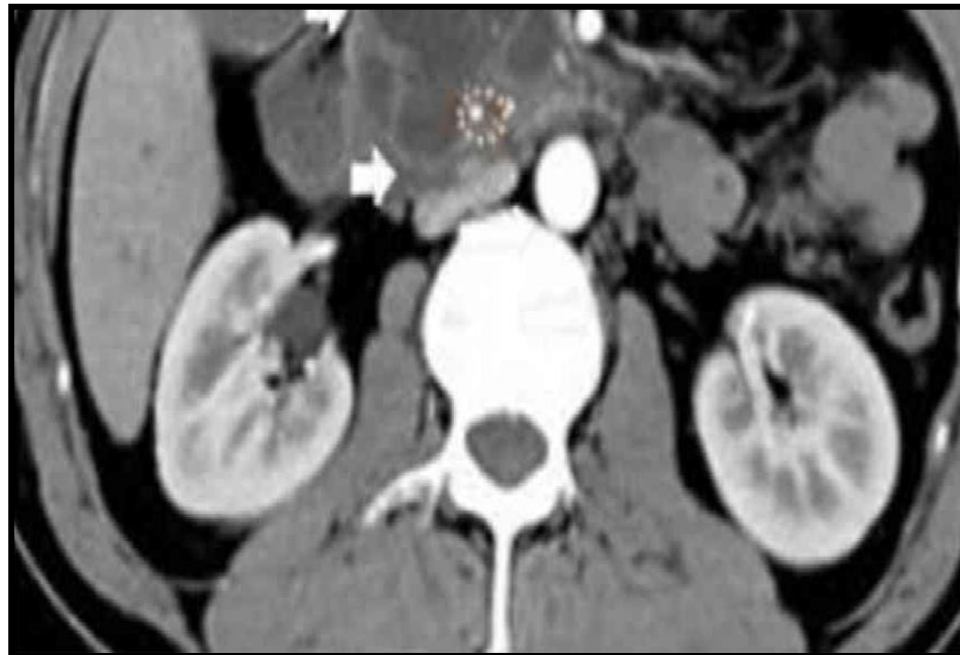
with anti-inflammatories and muscle relaxants and gradually got worse till he was admitted. Additionally, he experienced a brief period of moderately intense kneeling discomfort that only slightly improved with antispasmodics: skin jaundice, gradual weight loss, fatty dyspepsia, and loss of appetite during the past month. On physical examination, a thinned patient was found with severe skin and mucous membrane jaundice, no palpable abdominal masses, and no liver stigmata were present. A month before admission, he had a renal ultrasound that revealed no abnormalities, and a complete urine analysis revealed glycosuria of 3+, hemoglucotest of 335 mg/dl, Hb A1c of 8.5 %, creatinine of 0.67 mg/dl, and a routine chest x-ray. On admission, hemoglobin: 14.2 g/dl, leukocytes: 10,350 cells/mm<sup>3</sup>, lymphocytes: 15 %, eosinophils: 2 %, platelets: 352,000 cells/mm<sup>3</sup>, PT: 13.9 sec, glucose 149: mg/dl, TGO: 290 IU/L, TGP: 660 IU/L, alkaline phosphatase: 282 IU/L, total bilirubin: 8.5 mg/dl, direct bilirubin: 7.3 mg/dl, indirect bilirubin: 1.2 mg /dl, tumor markers: CEA: 6.5ng/dl, CA19-9: 13,500 U/L.

Multislice spiral computer tomography (MSCT) was requested for imaging studies. The results revealed the following: a tumor lesion that compromises the posteroinferior region of the pancreatic head, measuring 3.4 cm in greatest diameter, lying next to the superior

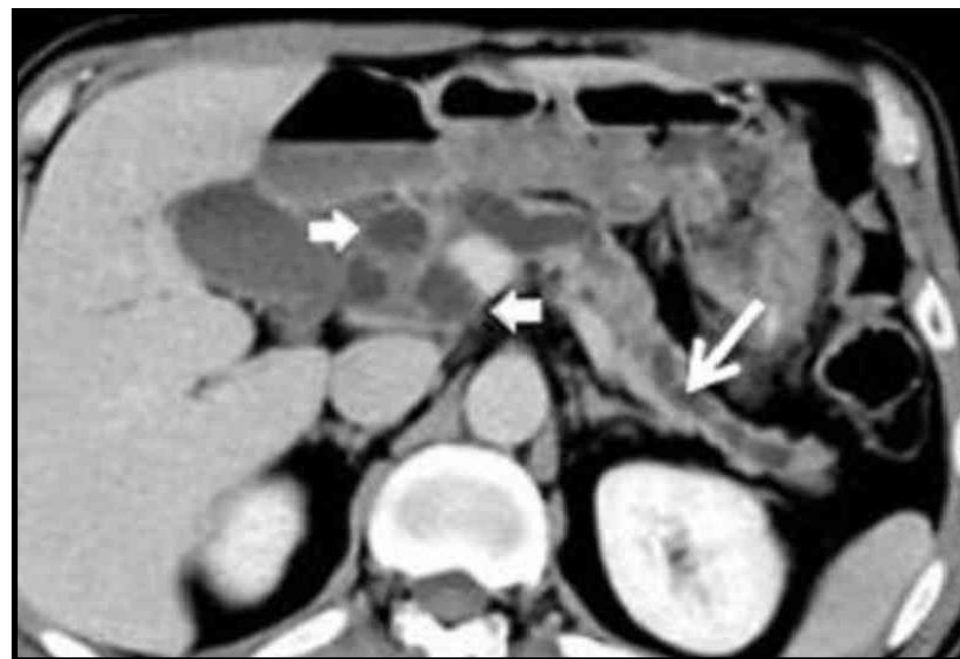
mesenteric artery without impairing it, surrounded by multiple adenopathies in the celiac region, and liver images consistent with liver metastasis, the largest of which was found in segment VII (**Figures 1 and 2**). An endoscopic ultrasonography (EUS) study was performed, and a tumor lesion of approximately 37 mm in diameter with irregular contours was visualized in the head of the pancreas. The tumor lesion had heterogeneous echogenicity surrounded by numerous metastatic-appearing lymph nodes, the common bile duct measured approximately 9 mm, the intrahepatic bile ducts were dilated, and multiple images consistent with liver metastasis and foci

were observed inside the liver parenchyma. A fine needle puncture was subsequently performed, guided by EUS in the center of the described mass, obtaining samples that were quickly extended into sheets and fixed in 98% absolute alcohol and others in 10 % formalin for cytological study. Histology confirmed the presence of a poorly differentiated adenocarcinoma of the pancreas (**Figure 3**).

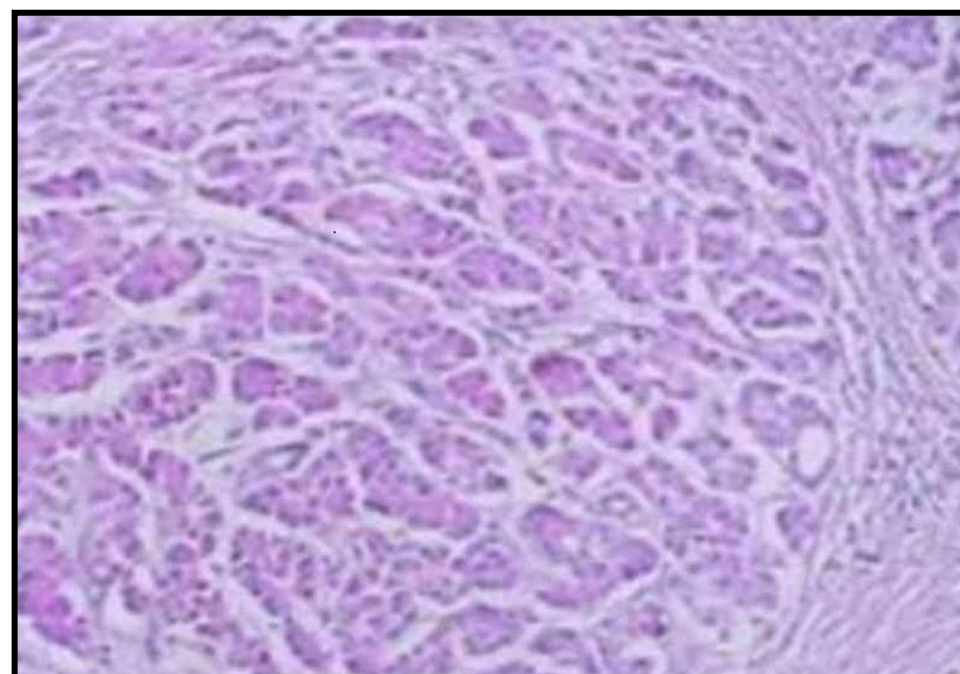
Subsequently, an endoscopic retrograde pancreatocholangiography (ERCP) was performed, which showed substantial tumor stenosis in the distal part of the common bile duct, a prosthesis for internal biliary drainage was placed, and subsequently chemotherapy was started.



**Figure 1:** homogeneous enhancement in the enhanced CT arterial phase



**Figure 2:** In the enhanced CT venous phase



**Figure 3:** Hematoxylin and eosin-stained cross section (magnification,  $\times 100$ ) revealed chronic inflammation of the pancreas with a dilated duct, focal fibrosis and pancreatic tissue necrosis.

## Discussion

The prevalence of pancreatic adenocarcinoma tends to rise with age; 80 % of diagnoses are made in patients over 60. Pancreatic cancer should be suspected precisely because of the difficulty of its early diagnosis and even more so in young people, even though the incidence is rare. The condition is more common in industrialized regions, with New Zealand reporting the highest incidence of cases and Nigeria and India the lowest [2]. According to some authors, the tumor has an equivalent impact on both sexes [3].

Alcoholism, smoking, family history of pancreatic, colon, ovarian, and breast cancer, as well as some associated occupational carcinogens like asbestos, ionizing radiation, gasoline, oil, coal, aluminum, rubber, chrome pigments, chemical compounds, pesticides, particularly organochlorines like DDT [4], are the risk factors for developing the disease. Regarding the dietary aspect, an increased risk is described in people with a high caloric intake, primarily based on carbohydrates and cholesterol, associated with poor information on fiber and vitamin C [5]. Although in the present scenario, the genetic study of neoplasms in general and pancreatic cancer, in particular, is still incipient, it is essential to emphasize the genetic component that involves this pathology, which includes a series of alterations in transmembrane genes related to fibrosis, cystic disease, DNA mutations such as in Fanconi anemia, and genetic polymorphisms in BRCA2, ERCC2, and SPINK 1 [6], all of which, together with environmental factors, probably explain the onset of this entity in patients at an early age and with symptoms of extensive metastasis. Currently, some studies try to identify the prognostic factors in unresectable pancreatic cancer, considering clinical and laboratory variables such as the onset of symptoms, pre-treatment CA 19-9 levels, bilirubin levels at the time of diagnosis, and other molecular markers that are under evaluation [7]. Since the early 1990s, research has been conducted to find methods that allow early detection of this disease pathology, considering the regional anatomy

of the pancreas, which is complex and makes its approach challenging. This research is necessary because most patients are diagnosed with the disease at an advanced stage and typically undergo conventional imaging studies.

EUS, which achieves superior precision for staging malignant neoplasms, especially in the perampullary and retroperitoneal region, has changed the management criteria for pancreatic masses suspected of being cancerous. It allows for better visualization of lesions smaller than 2 centimeters and the involvement of adjacent vascular structures [8]. EUS enables us to advise the therapy more effectively for cancer patients and more properly supplement the diagnostic test. It is well-recognized that EUS-guided fine-needle puncture, a minimally invasive way of sampling, is currently a significant component in diagnosing and characterizing malignant neoplasms of the pancreas. A sensitivity of 64 to 94 %, a specificity of 71 to 100 %, and an effectiveness of 78 to 95 % have been reported in case series [9]. In chronic pancreatitis, EUS-guided fine needle aspiration (FNA) has a 54 % sensitivity for diagnosing pancreatic cancer. It is well established that 5 to 6 punctures are needed to reach a diagnostic efficiency of 60 % when doing a pancreatic FNA. Said efficiency is raised to 80 % by further sample techniques, including trucut needles [10]. The positive economic effects of EUS have resulted in lower expenses and a decrease in the need for unneeded exploratory laparotomies [11].

The present clinical case involves a rare type of pancreatic cancer in a young patient, but as has already been established, diabetes mellitus has been linked to the neoplasm as a risk factor, which should prompt the recommendation to examine the pancreas in patients with these traits. On the other hand, this study is a good illustration of how EUS can be used to obtain the etiological and histological diagnosis minimally invasively at a reasonable cost, avoiding more expensive and risky surgical investigations.

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